

# Claims

[c1] What is claimed is:

1. A method for locating a synchronization signal of a next frame in a digital encoded signal, the digital encoded signal comprising a plurality of frames, each frame comprising the synchronization signal, the method comprising:

(a) utilizing a lookup table to determine a search region;  
and

(b) locating the synchronization signal of the next frame in the search region in the digital encoded signal.

[c2] 2. The method of claim 1 further comprising a step (c) prior to the step (a):

(c) receiving a bit-rate signal and a sampling-rate signal in a current frame of the digital encoded signal;

wherein in step (a), the lookup table is utilized to determine the search region according to the received bit-rate signal and the sampling-rate signal.

[c3] 3. The method of claim 2 wherein the lookup table is stored with specific search regions, each of which corresponds to each set of the bit-rate signal and the sampling-rate signal.

- [c4] 4. The method of claim 2 wherein each search region stored in the lookup table comprises a starting position and an ending position.
- [c5] 5. The method of claim 1 wherein in step (b), locating the synchronization signal of the next frame comprises backward-searching a predetermined data pattern in the search region.
- [c6] 6. The method of claim 1 wherein in step (b), locating the synchronization signal of the next frame comprises forward-searching a predetermined data pattern in the search region.
- [c7] 7. The method of claim 1 wherein in step (b), locating the synchronization signal of the next frame comprises backward-searching the predetermined data pattern matched for a first time in the search region.
- [c8] 8. The method of claim 1 wherein the digital encoded signal is generated according to MPEG audio standard.
- [c9] 9. An apparatus for searching a synchronization signal of a next frame in a digital encoded signal, the digital encoded signal comprising a plurality of frames, each frame comprising the synchronization signal, the apparatus comprising:

an input for receiving the digital encoded signal; and  
a searching module coupled to the input for determining  
a search region used to search the synchronization signal of the next frame according to a lookup table and for determining, in the search region, the position of the synchronization signal of the next frame.

- [c10] 10. The apparatus of claim 9 wherein the searching module is capable of receiving a bit-rate signal and a sampling-rate signal in a current frame of the digital encoded signal and utilizing the lookup table to determine the search region corresponding to the bit-rate signal and the sampling-rate signal.
- [c11] 11. The apparatus of claim 10 wherein the searching module comprises a memory unit for storing the lookup table.
- [c12] 12. The apparatus of claim 11 wherein the memory unit is a read-only memory.
- [c13] 13. The apparatus of claim 11 wherein the searching module further comprises:  
a header detector coupled to the buffer for receiving the bit-rate signal and the sampling-rate signal in the current frame; and  
a searching device coupled to the buffer and the memory

unit for determining the position of the synchronization signal of the next frame in the search region in the digital encoded signal.

- [c14] 14. The apparatus of claim 9 wherein the searching module backward-searches a predetermined data pattern in the search region of the digital encoded signal to determine the position of the synchronization signal of the next frame.
- [c15] 15. The apparatus of claim 9 wherein the searching module forward-searches a predetermined data pattern in the search region of the digital encoded signal to determine the position of the synchronization signal of the next frame.
- [c16] 16. The apparatus of claim 9 wherein the searching module backward-searches the predetermined data pattern matched for a first time in the search region of the digital encoded signal to determine the position of the synchronization signal of the next frame.
- [c17] 17. The apparatus of claim 9 wherein the digital encoded signal is generated according to MPEG audio standard.
- [c18] 18. A method for decoding a digital encoded signal having frames each comprising a header, the header includes a synchronization signal, an index signal, and a

frame-length indication signal, the frame-length indication signal indicates whether a current frame has a first length or a second length different from the first length, the method comprising the steps of:

- (a) receiving the bit-rate signal and the sampling-rate signal;
- (b) determining a search range according to the bit-rate signal and the sampling-rate signal; and
- (c) locating the synchronization signal of a next frame by backward-searching a predetermined data pattern in the search region.

[c19] 19. The method of claim 18, wherein the index signal includes a bit-rate signal and a sampling-rate signal.

[c20] 20. The method of claim 18, wherein step (b) further comprises referring to a lookup table for determining the search range according to the index signal.

[c21] 21. The method of claim 18, further comprising:  
(d) comparing a position of the synchronization signal of the next frame with a position of the synchronization signal of the current frame to determine whether the current frame has the first length or the second length without the need of referring to the frame-length indication signal.

- [c22] 22. The method of claim 18, wherein the frame-length indication signal includes a padding bit defined in MPEG audio standard.
- [c23] 23. A method for determining a frame length of a current frame in the process of decoding digital encoded signal, the digital encoded signal include frames each comprising a header, the header includes a synchronization signal, an index signal, and a frame-length indication signal, the frame-length indication signal indicates whether a current frame has a first length or a second length different from the first length, the method comprising:
- (a) receiving the index signal;
  - (b) determining a search range according to the index signal by referring to a lookup table;
  - (c) locating the synchronization signal of a next frame by searching a predetermined data pattern in the search region; and
  - (d) comparing a position of the synchronization signal of the next frame with a position of the synchronization signal of the current frame to determine whether the current frame has the first length or the second length without the need of referring to the frame-length indication signal.

- [c24] 24. The method of claim 23, wherein the step (c) further comprises locating the synchronization signal of a next frame by backward-searching the predetermined data pattern in the search region.
- [c25] 25. The method of claim 23, wherein the index signal comprises a bit-rate signal and a sampling-rate signal.
- [c26] 26. The method of claim 25, wherein the lookup table uses the bit-rate signal and the sampling-rate signal as indices for providing the search range.